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Lewis et al.

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(54) **LOG SPLITTER**

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B27L 7/06 (2006.01)

(52) **U.S. Cl.** **144/195.8**; 173/90

(58) **Field of Classification Search** 144/193.1, 144/193.2, 195.1, 195.7, 195.8, 286.1, 287, 144/286.5; 173/90, 91; 254/104; 108/122, 108/130, 146, 153.1, 158.11; 83/870–874, 83/438, 449; 248/168.2, 188.8; 280/47.24
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,150,038 A		8/1915	Kent	
3,176,320 A	*	4/1965	Miret	5/3
3,862,651 A		1/1975	Heikkinen	
4,258,764 A	*	3/1981	Gerst	144/193.1
4,353,401 A		10/1982	Schilling	
4,366,848 A	*	1/1983	Gavinski	144/195.1
4,446,898 A		5/1984	Manteufel	
4,454,902 A	*	6/1984	Larger	144/366
4,457,399 A		7/1984	Breisch	
4,483,379 A		11/1984	Aikins et al.	
4,498,293 A	*	2/1985	Gregory	60/478
4,553,576 A		11/1985	Maingueneau	
4,655,269 A		4/1987	Hanser et al.	
4,756,384 A		7/1988	Maddox	
4,790,168 A		12/1988	Vonthien	
5,460,211 A		10/1995	Minati	
5,472,029 A	*	12/1995	Ketch	144/371
5,492,159 A		2/1996	Maloshicky	
5,839,540 A		11/1998	Russell	
5,921,299 A	*	7/1999	Liu	144/195.1
6,386,249 B1		5/2002	Murphy	
6,640,930 B1		11/2003	Peters et al.	

* cited by examiner

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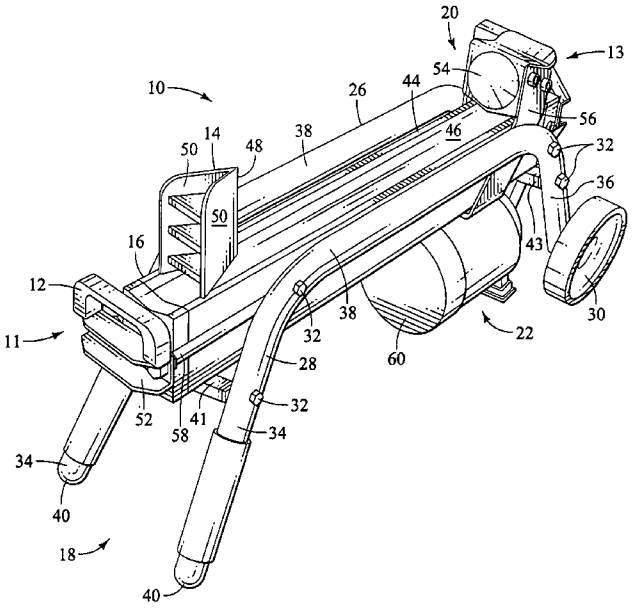
(57) **ABSTRACT**

A portably log splitter is provided. The log splitter comprises a base having a pair of one-piece side members, and a support member to which the one-piece side members are attached. The support member and the one-piece side members form a seat that is adapted to receive a log. The log splitter also includes a splitting wedge that is attached to the support member and a contact member that is configured to translate in a reciprocal manner adjacent to the support member in order to move the log. The log splitter also includes a control assembly operated by a switch to actuate the contact member in the reciprocal manner.

15 Claims, 8 Drawing Sheets



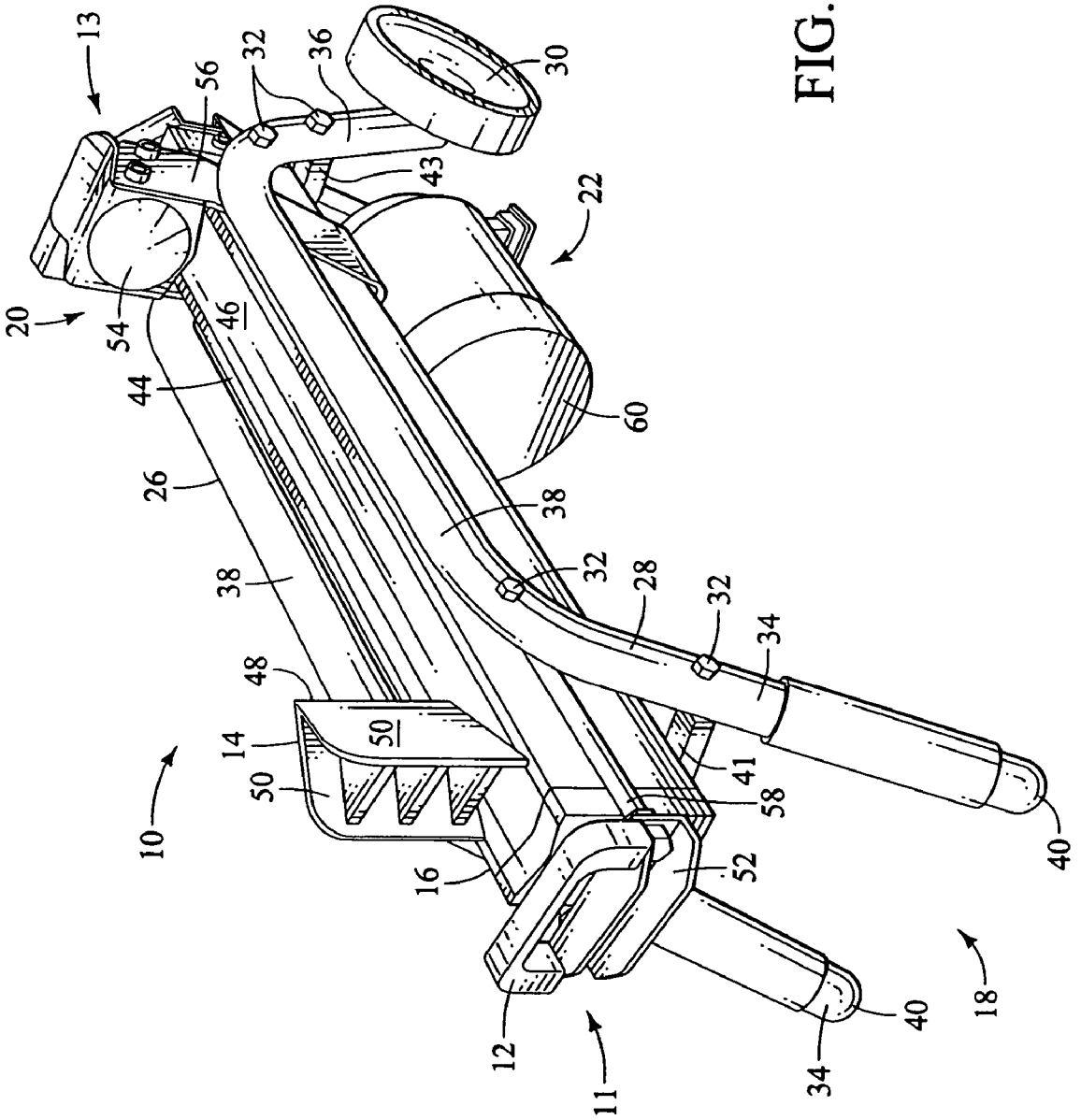

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FIG. 1

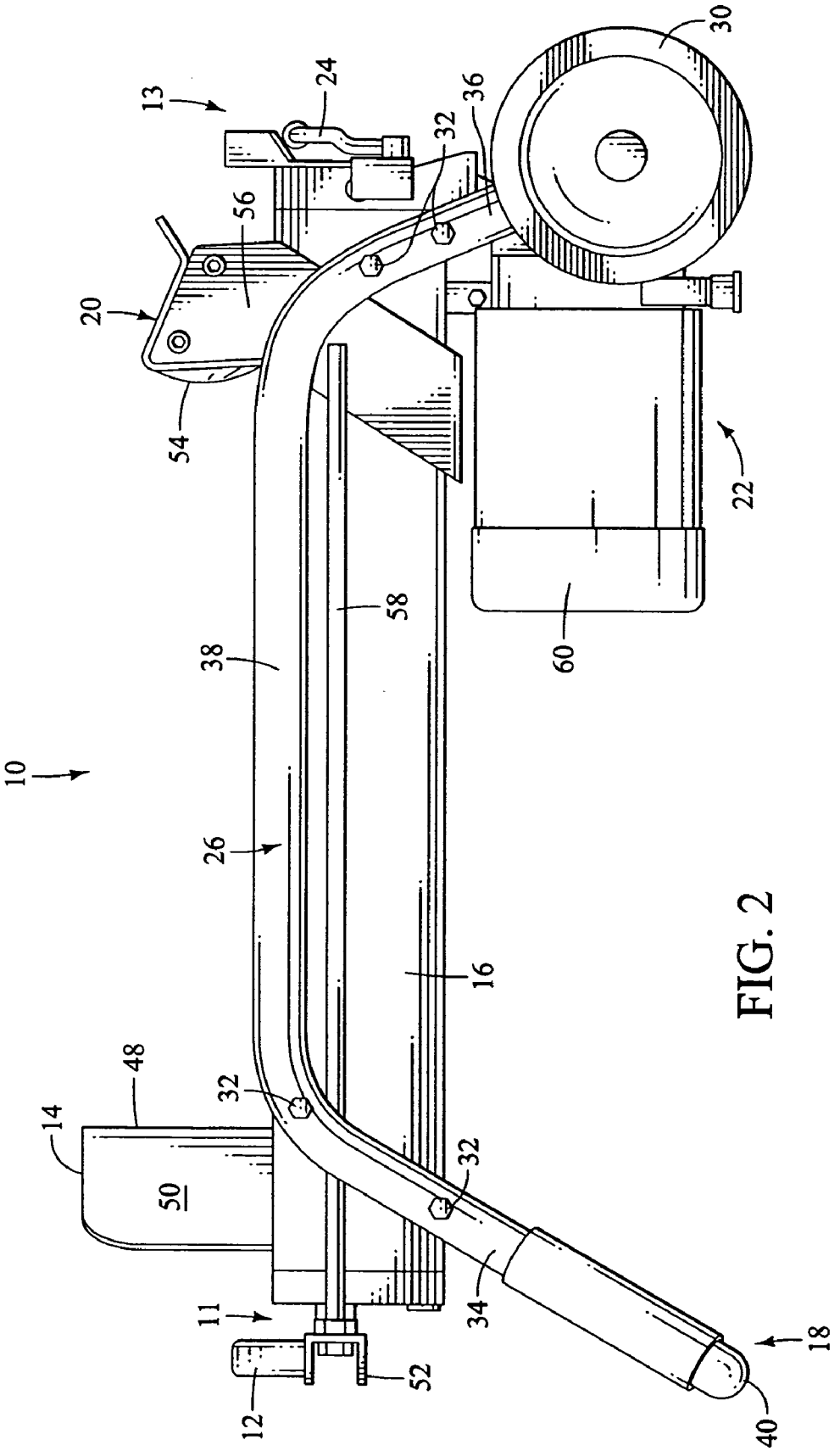

FIG. 2

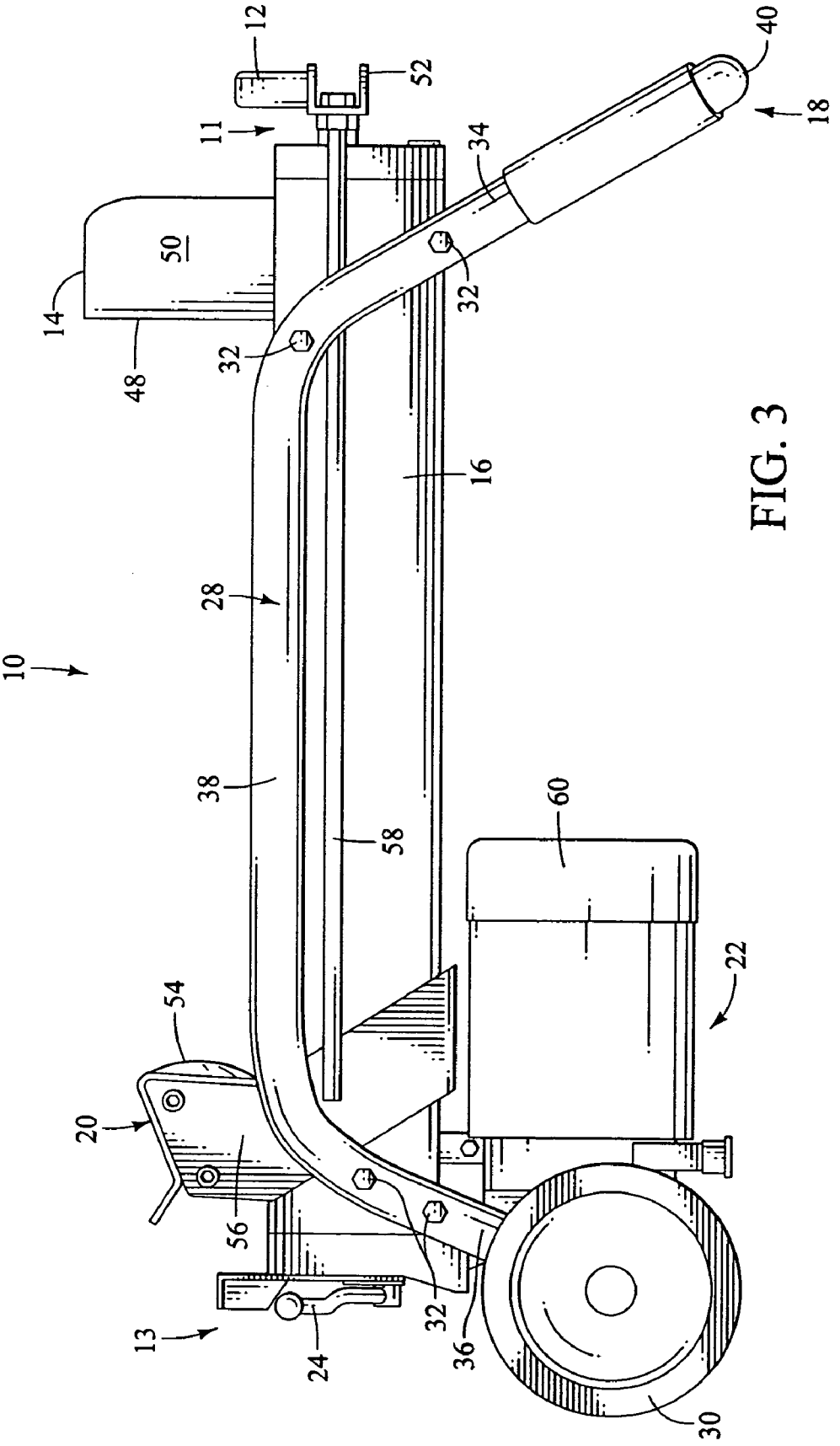
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FIG. 3

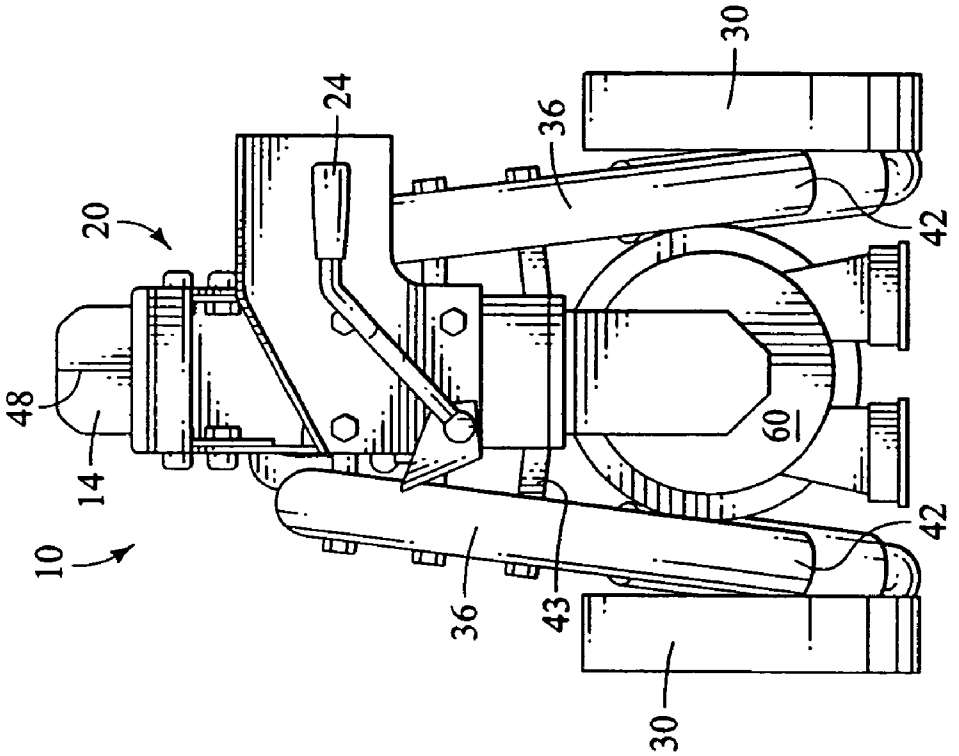
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FIG. 5

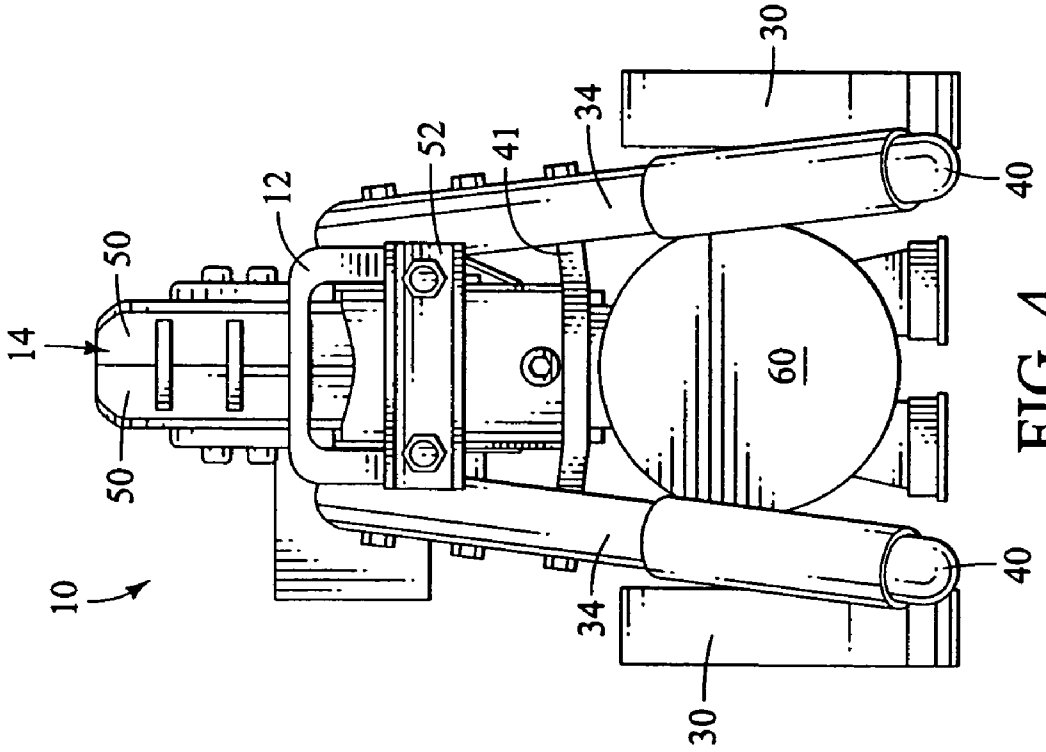
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FIG. 4

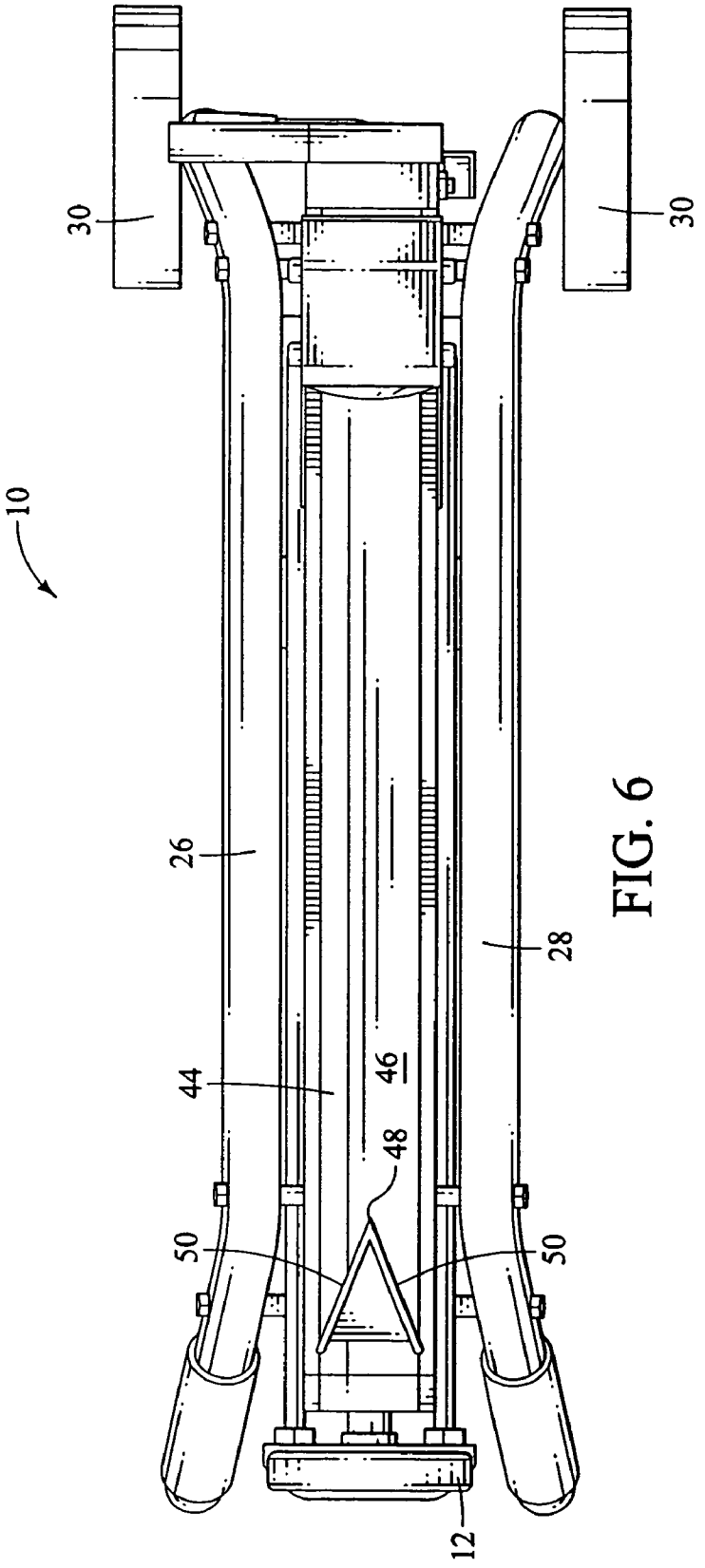

FIG. 6

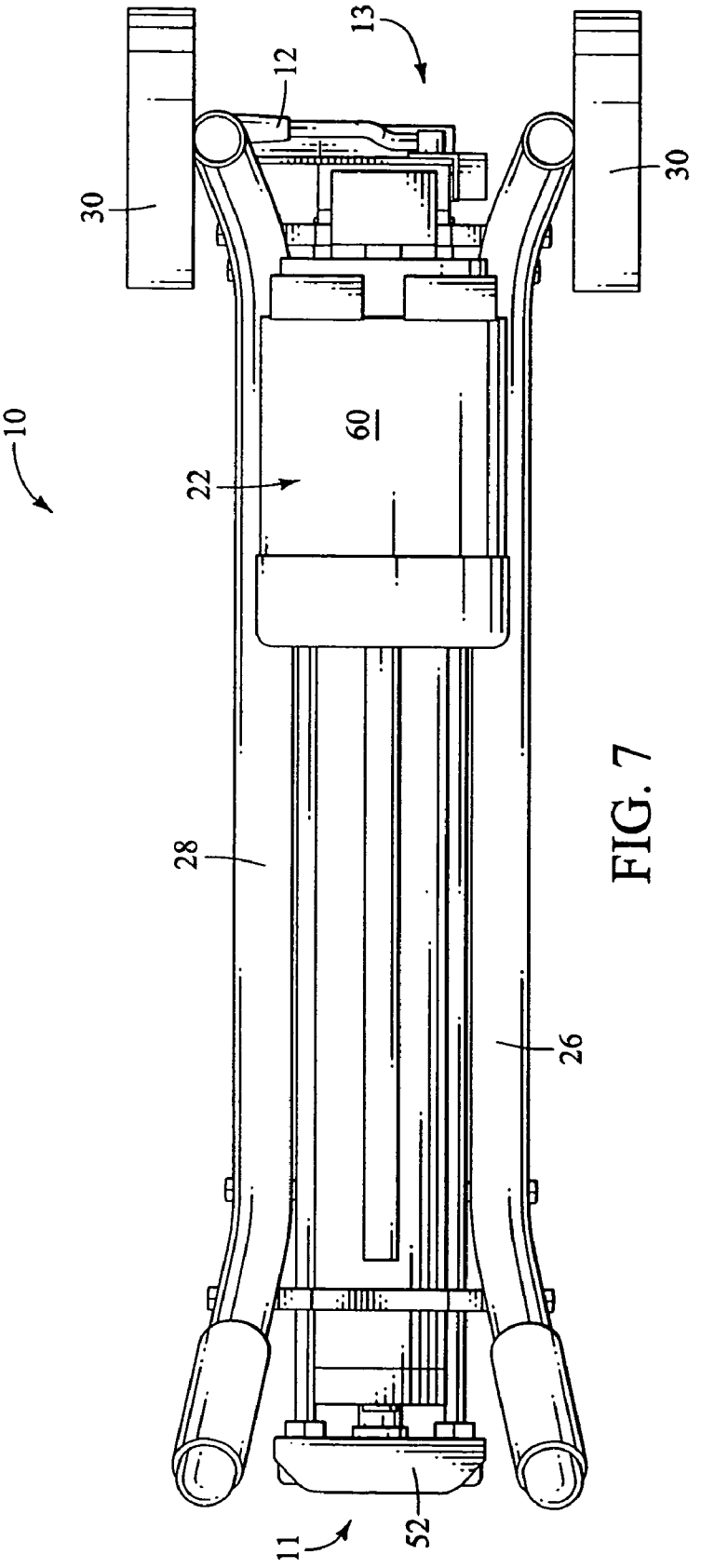

FIG. 7

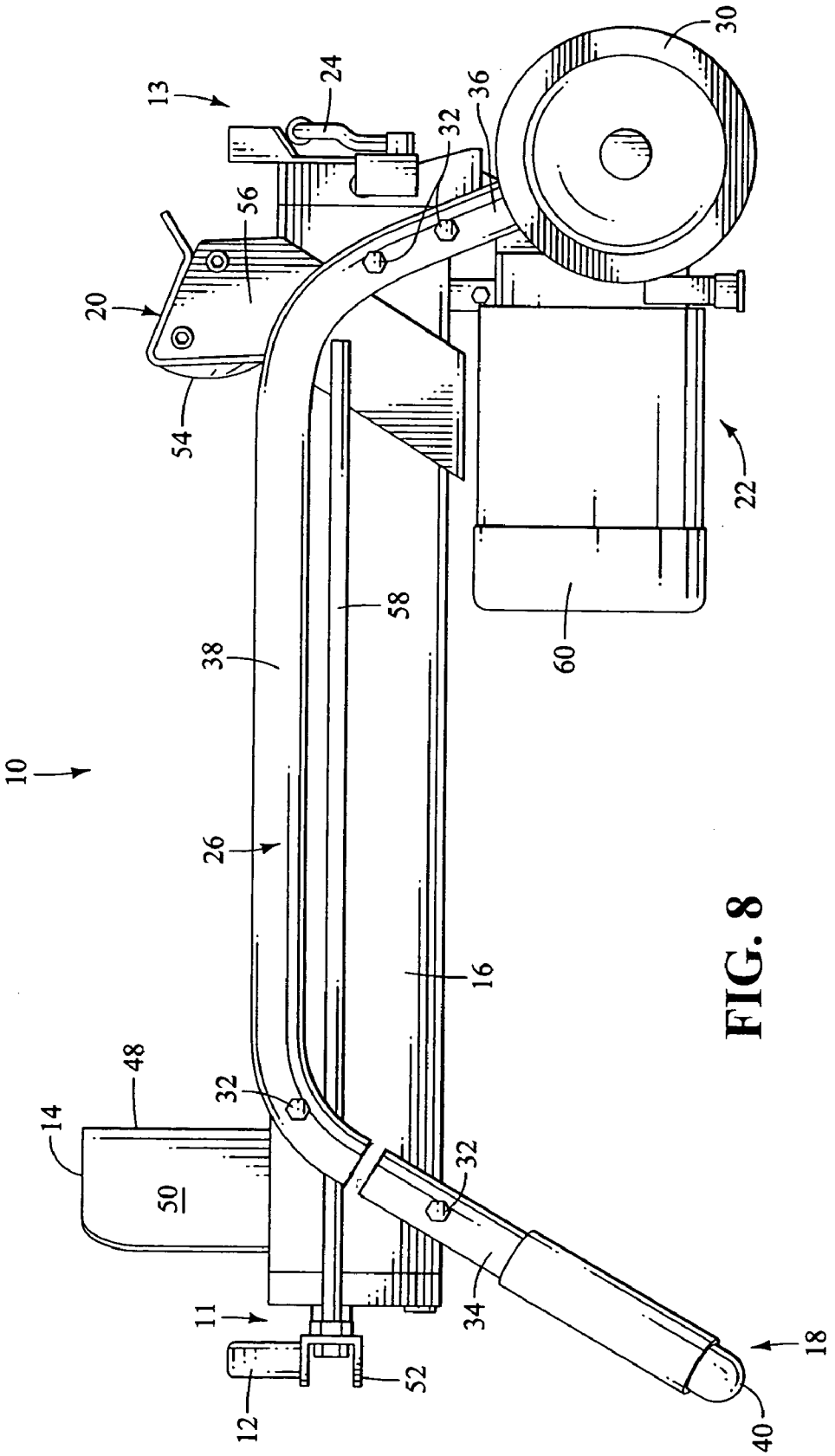

FIG. 8

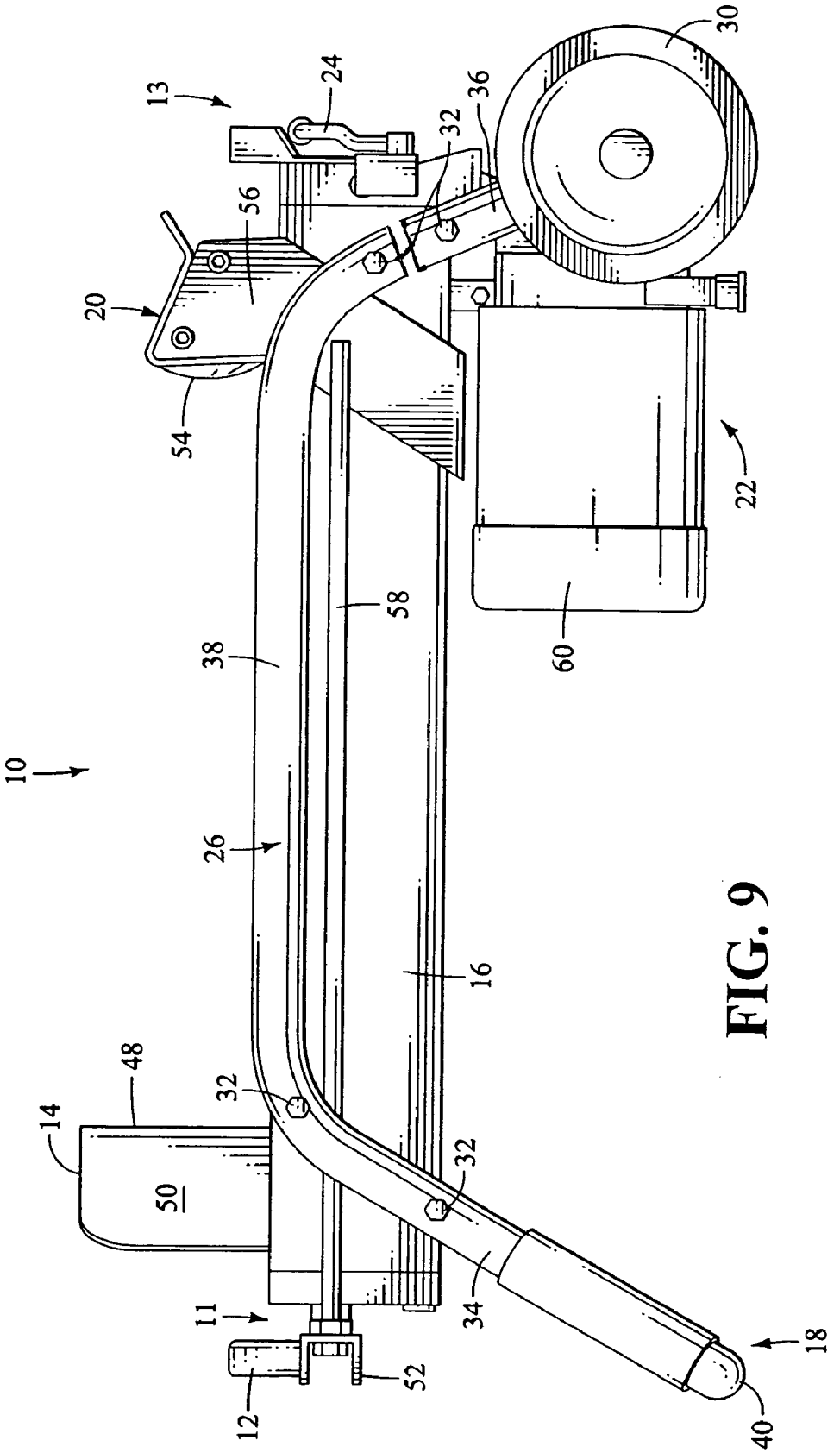

FIG. 9

LOG SPLITTER

FIELD OF THE INVENTION

This invention relates generally to a log splitter, and more specifically, to a portable log splitter.

BACKGROUND

Conventional log splitting devices are used in order to reduce large logs into smaller logs that are more portable. It is common for these log splitting devices to employ hydraulic systems to move a wedge toward a log or to move the log toward a stationary wedge in order to split the log. These hydraulic systems are often bulky, thereby causing the device to be heavy and awkward when trying to move the log splitting device between locations. Typical devices that allow for the portability of a log splitter are connected directly to the structural framework, but the typical portability devices provide poor structural support system for log splitting devices.

Large logs are very heavy and are typically odd-shaped such that balancing a log on a conventional log splitting device is difficult. The support structure for these conventional log splitting devices does not provide sufficient support to allow for a heavy log having a variable shape to be adequately placed on the log splitting device in a stable manner without tipping the log splitting device or the log rolling off before being cut. The typical support structure that maintains the log in a desired position, or allows the log to translate, is generally not sufficient to support logs having a heavy weight.

It is therefore desirable to have a log splitting device that is easily portable between different locations and provides a stable foundation. It is further desirable to have an improved log splitting device that is able to support large logs on the log splitting device without tipping yet able to prevent the log from rolling off.

BRIEF SUMMARY

The present invention solves one or more of the shortcomings above by providing a pair of one-piece side members that, in conjunction with a support member, form a seat adapted to receive a log. The embodiments described herein allow for a cost-effective log splitter being more stable than conventional log splitting devices. Such improvements greatly increase the safety and ease of portability for the log splitter.

In one aspect of the invention, a log splitter is provided. The log splitter includes a base having a pair of one-piece side members. The one-piece side members are attached to a support member that is located between the one-piece side members. The one-piece side members and the support member form a seat that is adapted to receive a log. A splitting wedge is operably connected to the support member. A contact member is configured to translate in a reciprocal manner along the length of the support member in order to move the log. A control assembly, operated by a switch, is configured to actuate the contact member in the reciprocal manner.

In another aspect of the invention, a method for splitting a log is provided. The method includes providing a splitting wedge that is operably connected to a support member. A pair of one-piece side members are connected to the support member to form a base, and the support member and the one-piece side members form a seat that is adapted to receive a log. The method further includes moving a contact member toward the splitting wedge in order to cut the log. Furthermore, the contact member is configured to move in a reciprocal manner adjacent to the support member.

Advantages of the present invention will become more apparent to those skilled in the art from the following description of the preferred embodiments of the invention which have been shown and described by way of illustration. As will be realized, the invention is capable of other and different embodiments, and its details are capable of modification in various respects.

Accordingly, the drawings and description are to be regarded as illustrative in nature and not as restrictive.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a top perspective of one embodiment of a log splitter;

FIG. **2** is a right side view of the log splitter of FIG. **1**;

FIG. **3** is a left side view of the log splitter of FIG. **1**;

FIG. **4** is a front view of the log splitter of FIG. **1**;

FIG. **5** is a rear view of the log splitter of FIG. **1**;

FIG. **6** is a top view of the log splitter of FIG. **1**;

FIG. **7** is a bottom view of the log splitter of FIG. **1**;

FIG. **8** is a right side view of a second embodiment of the log splitter; and;

FIG. **9** is a right side view of a third embodiment of the log splitter.

DETAILED DESCRIPTION OF THE DRAWINGS AND THE PRESENTLY PREFERRED EMBODIMENTS

Referring to FIGS. **1**–**2**, one embodiment of a log splitter **10** of the present invention is shown. The log splitter **10** includes a handle **12**, a splitting wedge **14**, a support member **16**, a base **18**, a guide assembly **20**, a control assembly **22**, and a switch **24**. Preferably, the handle **12** is located at the forward end **11** of the log splitter **10** and the switch **24** is located at the rearward end **13** of the log splitter **10** such that the switch **24** is disposed near the control assembly **22**. The handle **12** is preferably located at the end opposite the switch **24** and the control assembly **22** such that the log splitter **10** is more readily moveable by allowing the user to lift the lighter end of the log splitter **10**.

In the preferred embodiment, the base **18** includes a first side member **26**, a second side member **28**, and a wheel **30** attached to each side member **26**, **28**, as illustrated in FIGS. **1**–**2**. The side members **26**, **28** form a foundation for the log splitter **10** such that during the transport and operation, the log splitter **10** remains stable. The side members **26**, **28** are located on opposing sides of the support member **16**, and are oriented such that the side members **26**, **28** are disposed adjacent to the side surfaces of the support member **16** that extends along the length of the log splitter **10**. The side members **26**, **28** are preferably attached to the support member **16** by way of a plurality of bolts **32**. However, it should be understood by one skilled in the art that the side members **26**, **28** can be connected to the support structure by any means including, but not limited to, welding, rivets, or any combination thereof.

In the preferred embodiment, each side member **26**, **28** is preferably a one-piece member and made of a hollow tube forming a front leg **34**, a rear leg **36**, and a center section **38**, as illustrated in FIG. **2**. The center section **38** is configured to extend in a substantially parallel manner relative to the side surfaces of the support member **16**, and the legs **34**, **36**

are configured to extend from the center section **38** at an angle thereto. In the preferred embodiment, each side member **26**, **28** is formed from a single tube, but it should be understood by one skilled in the art that the front leg, rear leg, and center section can each be formed by individual members that are attached to form a single one-piece side member **26**, **28**. Furthermore, the tube forming the side members **26**, **28** is preferably hollow, but it should be understood by one skilled in the art that a solid tube can also be used. The tubes of the side members **26**, **28** are preferably made of steel, but any other material sufficient to withstand the loads applied to the log splitter can be used.

In an alternative, each side member **26**, **28** can be a one-piece member forming a center section **38** and a rear leg **36**, as illustrated in FIG. **8**. The front leg **34** is attached directly to support member **16** without being attached to the one-piece side members **26**, **28**. In a further alternative embodiment, each side member **26**, **28** can be a one-piece member forming a center section **38** and a front leg **34**, as illustrated in FIG. **9**. The rear leg **36** is attached directly to support member **16** without being attached to the one-piece side members **26**, **28**. It should be understood by one skilled in the art that each one-piece side member can include a center section **38** in combination with a front leg **34** and a rear leg **36**, a center section **38** in combination with only a front leg **34**, or a center section **38** in combination with only a rear leg **36**. It should also be understood by one skilled in the art that a side member can include a different combination of legs with the center section than the opposing side member.

Both the front leg **34** and rear leg **36** of each of the side members **26**, **28** extend downward from the center section **38** at an angle of between about fifteen and one hundred sixty five degrees (15–165°). The front leg **34** preferably extends from the center section **38** such that the included angle between the front leg **34** and the center section **38** is about one hundred twelve degrees (112°), and the rear leg **36** preferably extends from the center section **38** such that the included angle between the rear leg **36** and the center section **38** is about one hundred ten degrees (110°). The legs **34**, **36** provide a base upon which the forward end **11** and rearward end **13** of the log splitter **10** contact the ground. The end **40** of each front leg **34** opposite the connection between the front leg **34** and the center section **38** is configured to contact the ground is preferably rounded. In an alternative embodiment, the distal end **40** of the front leg **34** is capped. A wheel **30** is preferably attached to the distal end **42** of each rear leg **36** opposite the connection between the rear leg **36** and the center section **38**. The wheels **30** allow the log splitter **10** to be easily transferred from one location to another by way of rolling the apparatus on the wheels **30**. In an alternative embodiment, a wheel is attached to the ends of both legs of the side members, thereby allowing the user to roll the log splitter along the ground without lifting either end.

As the front legs **34** extend downward from the center section **38**, the front legs **34** also extend outward away from the support member **16**, as illustrated in FIG. **4**. As illustrated in FIG. **5**, the rear legs **36** likewise extend in an outward direction away from the support member **16** as the rear legs **36** extend downward from the center sections **38**. Because the ends **40**, **42** of the legs **34**, **36** extend in an outward direction away from the support member **16**, the legs **34**, **36** provide a more stable base upon which the log splitter **10** rests by having a more stable footprint in the lateral direction. The distance between the ends **40** of the front legs **34** is between about seven and twelve inches (7–12"), and preferably is about eight and one-quarter inches (8¼"). The distance between the ends **42** of the rear legs **36** is between about seven and twelve inches (7–12"), and preferably is about eight inches (8"). The footprint of the log splitter **10** provides an advantage over conventional log splitters by making the log splitter more stable.

The front legs **34** are connected by a first cross tie **41** located below the support member **16**, and the rear legs **36** are connected by a second cross tie **43** also located below the support member **16**. These cross ties **41**, **43** provide additional structural support to the base **18** by preventing outward deflection of the legs **34**, **36** away from support member **16** when a large log is placed upon the log splitter **10**. The cross ties **41**, **43** ensure that the base **18** remains stable so as to prevent the log splitter from tipping.

The support member **16**, as shown in FIG. **1**, provides a structural framework to the log splitter **10**, and further provides a structure to which other components of the log splitter are connected. In one embodiment, the support member **16** is formed of a substantially rectangular tube having a square cross-section. The top surface **44** of the support member **16** includes an inward-directed indentation **46** along the entire length of the support member. This indentation **46** is configured to receive a log placed on the top surface **44** of the support member **16** and between the center section **38** of the opposing side members **26**, **28**. The center sections **38** of the opposing side members **26**, **28** are preferably spaced apart by about **6** inches (6"). However, it should be understood by one skilled in the art that the center sections **38** of the opposing side members **26**, **28** can be any distance sufficient to receive a log and provide a stable base for the log splitter **10**. The top surface **44** is preferably disposed below the upper edge of the center sections **38**, such that the shape of the indentation **46** of the top surface **44** and the center sections **38** of the opposing side members **26**, **28** form a generally rounded seat, or recess, to support a log on the log splitter **10**.

The side members **26**, **28** are spaced apart from the support member **16**, as shown in FIG. **1**, thereby allowing a greater lateral support for a log. The side members **26**, **28** and the support member **16** form a seat in which a log can be placed. It should be understood by one skilled in the art that a log placed on the spaced apart side members **26**, **28** may have a diameter or a particular shape such that the log does not contact the top surface **44** of the support member **16**, yet the top surface **44** of the support member **16** remains configured to receive and support a log. Because the side members **26**, **28** and the top surface **44** of the support member **16** are configured to receive the log, the spaced-apart side members **26**, **28** provide for more lateral support such that more surface area of the log is disposed on the log splitter **10**. The increased lateral support, in combination with the more stable footprint of the base **18**, provides the log splitter **10** with a stable support structure upon which a log is placed.

The side members **26**, **28** are configured to provide the log splitter **10** with a stable base as well as provide structural support for receiving a log. While the legs **34**, **36** contact the ground and maintain the operating mechanisms of the log splitter **10** a safe distance above the ground, the center section **38** of the side members **26**, **28** receive the weight of a log and transmit the weight through the legs **34**, **36** to the ground. Conventional log splitters have legs that are directly attached to the structural framework of the apparatus, and separate guide members are attached to the structural framework in order to receive the weight of the log. Another advantage of the present invention is that the one-piece side members **36**, **38** provide both a stable base as well as a

structural support for receiving and transmitting the loads of a log. A further advantage of the present invention over conventional log splitting devices is that the one-piece structure of the side members **36**, **38** requires fewer parts and less tooling than conventional log splitters, thereby reducing the costs associated with manufacturing a log splitter.

The splitting wedge **14** is operably connected to the top surface **44** of the support member **16**, as illustrated in FIG. **1**. The splitting wedge **14** is a wedge-shaped member having a vertical edge **48** directed toward the longitudinal direction of the log splitter **10** such that the vertical edge **48** is configured to contact and cut a log. The splitting wedge **14** has a pair of side pieces **50** that extend from the vertical edge **48** and form an angle therebetween. The angle formed between the side pieces **50** can vary depending upon the application of the log splitter **10**. The preferred angle formed by the side pieces **50** is between about thirty and fifty-five degrees (30–55°). Splitting wedges are not new to the art, and as such, it should be understood by one skilled in the art that any splitting wedge sufficient to cut wood can be used.

In the preferred embodiment, the splitting wedge **14** is rigidly attached to the support member **16** such that the movement of the guide assembly **20** causes the log to move toward the splitting wedge **14** to be cut. However, it should be understood by one skilled in the art that the present log splitter can be configured such that the guide assembly remains stationary as the splitting wedge is caused to be actuated in order to cut the log. The splitting wedge **14** is preferably welded to the top surface **44** of the support member **16**, but any other means of attaching the splitting wedge to the support member sufficient to withstand the loads during the operation of the log splitter can be used.

The guide assembly **20** includes a c-bracket **52**, a contact member **54**, a pair of brackets **56**, and a pair of rods **58**, as illustrated in FIGS. **1**–**4**. The guide assembly **20** is configured to actuate the contact member **54** toward and away from the stationary splitting wedge **14** in a translational manner by way of reciprocal movement relative to the longitudinal direction of the support member **16**. In an alternative embodiment, the guide assembly includes a splitting wedge that is configured to be actuated toward a stationary contact member. In a further alternative embodiment, the guide assembly includes a splitting wedge that is configured to be actuated toward a stationary splitting wedge such that both ends of a log are cut by a splitting wedge. The contact member **54** has a pair of brackets **56** attached to opposing sides thereof. The brackets **56** extend along the vertical sides of the contact member **54** and around the bottom of the support member **16** where adjacent edges of the brackets **56** are attached to each other. The c-bracket **52** is located adjacent to the forward end **11** of the log splitter **10**, and operably connected to the brackets **56** by way of a pair of rods **58**. The rods **58** are disposed between the side members **26**, **28** and the support member **16** such that as the contact member **54** is actuated in the reciprocal manner, the brackets **56** remain between the side members **26**, **28** and the support member **16**.

The handle **12** is connected to the c-bracket **52**, as illustrated in FIGS. **1** and **4**. The handle **12** is configured to allow the user to grasp the handle **12** and lift the forward end **11** of the log splitter **10** away from the ground. The handle **12** and c-bracket **52** are configured to actuate as the contact member **54** translates toward the splitting wedge **14**. However, it should be understood by one skilled in the art that the handle can be configured to be attached directly to the support member. In an alternative embodiment, a plurality of handles extend from a proximal point connected to the support member such that the handles are configured in a wheelbarrow-type manner.

The control assembly **22** is configured to actuate the guide assembly **20** in order to cut a log. The control assembly **22** includes a motor **60** operatively connected to at least one cylinder (not shown). The cylinder is disposed within the support member **16** and is configured to extend and retract a push arm, thereby actuating the contact member **54** toward and away from the splitting wedge **14**. In the preferred embodiment, the motor **60** and cylinder form a hydraulic system. In an alternative embodiment, the cylinder is air-operated by the motor. It should be understood by one skilled in the art that any other actuating means sufficient to actuate the guide assembly so as to cut a log can be used. In the preferred embodiment, the cylinder is connected to the c-bracket **52** located at the forward end **11** of the log splitter **10**. The operative stroke of the cylinder is sufficient to allow the contact member **54** to be actuated between a first operative position and a second operative position. When in the first operative position, the contact member **54** is located adjacent to the rearward end **13** of the log splitter **10**, and when in the second operative position, the contact member **54** is in contact with the vertical edge **48** of the splitting wedge **14**. The motor **60** is operated by way of a moveable switch **24**, as illustrated in FIG. **5**, which is manually controlled by a user.

In operation, the user moves the switch **24** from a first position to a second position, thereby causing the motor **60** to operate the cylinder such that the guide assembly **20** moves in a manner in which the c-bracket **52** extends away from the support member **16** and the contact member **54** translates from the first operative position toward the splitting wedge **14** by way of the rods **58** that connect the c-bracket **52** and the brackets **56** to the contact member **54**. The cylinder is operable such that the contact member **54** can assume any point between the first operative position and the second operative position. Once the log is split, the user moves the switch **24** to a third position, thereby causing the motor to operate the cylinder such that the guide assembly **20** moves in a manner in which the contact member **54** translates in a direction away from the splitting wedge **14**. When the switch is returned to the first position, the motor is stopped, thereby preventing the cylinder from operating.

In an alternative embodiment, the guide assembly is configured to be spring-loaded such that the contact member begins at a location adjacent to the splitting wedge, and the operator moves the switch to cause the cylinder to actuate the contact member away from the splitting wedge. Once there is sufficient space, a log is placed between the contact member and the splitting wedge. The operator then directs the cylinder to actuate the contact member to the furthest point from the splitting wedge. The operator then pushes a button (not shown) that causes the contact member to rapidly translate toward the splitting wedge, thereby cutting the log.

In a further alternative embodiment, the cylinder is configured to actuate a spring-loaded splitting wedge away from a stationary contact member in the same manner as the spring-loaded contact member previously discussed. When the operator pushes the button, the splitting wedge rapidly translates toward the contact member, thereby cutting the log.

While preferred embodiments of the invention have been described, it should be understood by one skilled in the art that the invention is not so limited and modifications may be made without departing from the invention. The scope of the

invention is defined by the appended claims, and all devices that come within the meaning of the claims, either literally or by equivalence, are intended to be embraced therein.

The invention claimed is:

1. A log splitter comprising:

a support member having a top surface, two opposing side surfaces extending from the top surface, a front portion and a rear portion, wherein the support member is adapted to receive a log;

a first leg assembly provided on a first side surface and including a first front leg, a first rear leg, and a center section extending from the front portion toward the rear portion and connecting the first front leg and the first rear leg;

a second leg assembly provided on a second side surface and including a second front leg, a second rear leg, and a center section extending from the front portion toward the rear portion and connecting the second front leg and the second rear leg, wherein the center section of the first leg assembly and the center section of the second leg assembly lie in substantially the same horizontal plane, which is disposed above the top surface of the support member;

a splitting wedge operably connected to said support member;

a contact member configured to translate in a reciprocal manner adjacent to said support member in order to move said log; and

a control assembly, wherein said control assembly is configured to actuate said contact member in said reciprocal manner.

2. The log splitter of claim **1**, wherein said center section of each of first and second leg assembly is disposed adjacent to opposing sides of said support member.

3. The log splitter of claim **2**, wherein said front leg of each of the first and second leg assembly extends downward and away from said support member.

4. The log splitter of claim **3**, wherein said front legs are connected by a first cross tie.

5. The log splitter of claim **1**, wherein said rear leg of each of the first and second leg assembly extends downward and away from said support member.

6. The log splitter of claim **5**, wherein a wheel is rotatably connected to an end of said rear leg of each of the first and second leg assembly.

7. The log splitter of claim **1** further comprising a handle operatively connected to said support member.

8. The log splitter of claim **1**, wherein said control assembly includes a motor and at least one cylinder.

9. The log splitter of claim **8**, wherein said cylinder is air operated.

10. The log splitter of claim **8**, wherein said cylinder is hydraulically operated.

11. A log splitter comprising:

a splitting wedge operably connected to a support member, wherein said support member includes a top surface, two opposing side surfaces extending from the top surface, a front portion and a rear portion;

a first leg assembly provided on a first side surface and including a first front leg, a first rear leg, and a center section extending from the front portion toward the rear portion and connecting the first front leg and the first rear leg;

a second leg assembly provided on a second side surface and including a second front leg, a second rear leg, and a center section extending from the front portion toward the rear portion and connecting the second front leg and the second rear leg, wherein the center section of the first leg assembly and the center section of the second leg assembly lie in substantially the same horizontal plane, which is disposed above the top surface of the support member; and

a guide assembly configured to translate toward and away from said splitting wedge, wherein one of the support member or the first and second leg assembly support a log.

12. The log splitter of claim **11**, wherein a wheel is attached to an end of each of the first and second rear leg.

13. The log splitter of claim **12**, wherein a handle is operatively connected to said support member, and said handle is configured to allow a user to lift at least one end of said support member.

14. The log splitter of claim **11**, wherein said guide assembly comprises a contact member, a pair of brackets, a pair of rods, and a c-bracket, wherein said pair of brackets are connected to opposing sides of said contact member and said pair of brackets being connected to each other, and said rods extending substantially parallel to said support member.

15. The log splitter of claim **14**, wherein said c-bracket is operably connected to a cylinder having an operative stroke such that said contact member is movable between a first operative position and a second operative position.

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